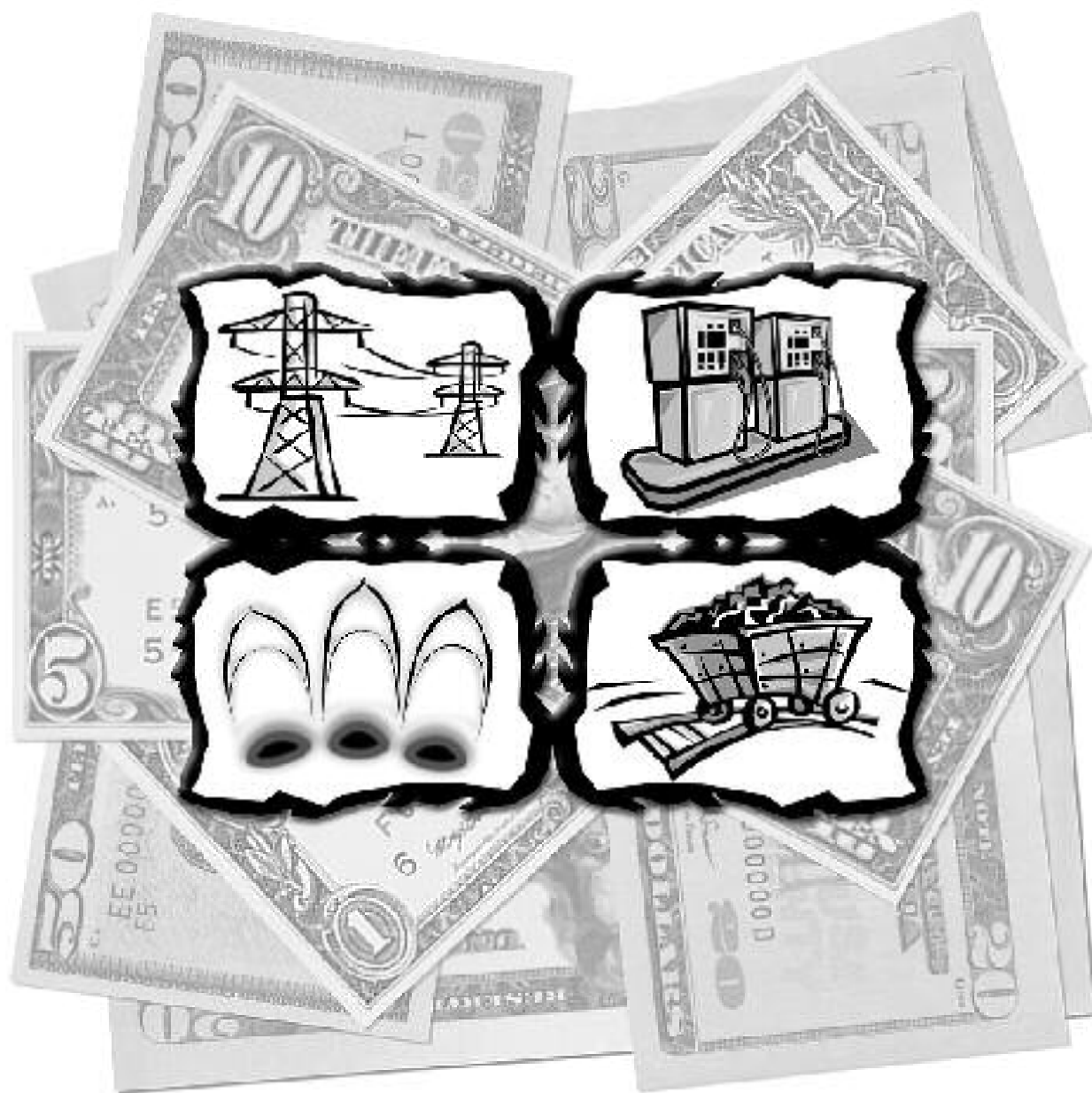


ENERGY DOLLAR FLOW ANALYSIS

*for the
State of Arizona*



ARIZONA DEPARTMENT OF COMMERCE

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ENERGY OFFICE

EXECUTIVE SUMMARY

The Energy Dollar Flow Analysis examines energy consumption and its economic impact on the State of Arizona.

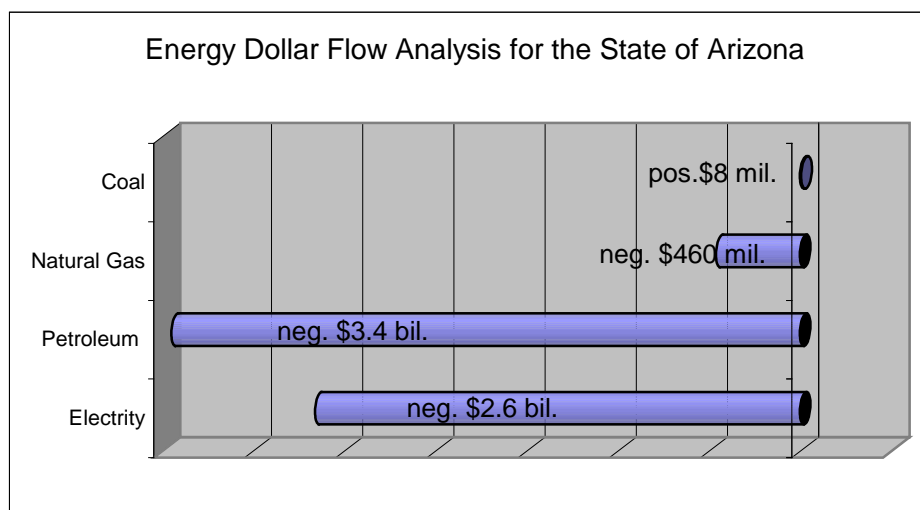
Energy is an essential commodity in today's world. It lights homes, commercial and industrial buildings, powers cars, and fuels power plants. This study follows the flow of dollars spent for selected energy services by Arizona consumers during 2003, which is the last year relevant data is available, to determine the percentage of end-user energy expenditures that are not reinvested in the state by energy suppliers.

This report documents that 62.7 percent of the money Arizona residents spent on energy in 2003 – \$6.3 billion – left the state.

2003 Energy Usage Segmented by Sector

Industry	Not Reinvested	% Not Reinvested
Electricity	\$2,658,533,299	56.5%
Petroleum	\$3,446,231,168	79.4%
Natural Gas	\$459,146,484	58.2%
Coal	-\$8,095,605	-4.5%
Coal Adjustment Factor *	-\$275,621,978	
Total	\$6,280,193,368	62.7%

* Coal Adjustment Factor: A future level of analysis is necessary for an aggregated expenditure estimate, because electric utilities consume coal as a feedstock fuel for electricity generation. To eliminate double counting of coal revenues and purchases between the coal and electric utility sectors, a dollar adjustment factor equivalent to electric utility purchases of in-state coal is applied as a correction.



Published, publicly available data were used to prepare this report and were supplemented with information collected after discussions with accountants and economists from utilities, government agencies, and private companies.

This analysis was conducted by Mark Hope, Energy Economist.

ENERGY DOLLAR FLOW ANALYSIS FOR THE STATE OF ARIZONA

INTRODUCTION

Energy and economic development are very much connected. As Arizona continues to experience robust growth, Arizona's energy providers face the challenge of meeting rising demand and ensuring a reliable and affordable energy supply for the state. In Arizona, the Department of Commerce is the lead agency responsible for promoting economic development. An integral part of the agency's mission is the understanding and optimal use of all resources available within the state that can benefit the state's economy.

Capital is an essential resource for economic development and this report focuses on a potential source of that capital: *energy expenditures*. This report documents the flow of funds spent on energy by end-use consumers in Arizona during 2003, and identifies the portion of those expenditures that are not reinvested, within the state, as local expenditures and investment, state and local taxes, and wages paid.

The intent of the analysis is to demonstrate the potential of retaining funds for expenditure or investment in Arizona through a more conscious effort to promote energy efficiency technologies and conservation measures. The percentage of energy expenditures not reinvested in Arizona, is not an exact figure. An exact figure can only be calculated through sophisticated models or detailed audits of the various industry's' records. This analysis is based on publicly available data, supplemented by information from conversations with representatives of the relevant industries and government energy economists.

METHODOLOGY

This report examines four principal energy sources: electricity, petroleum, natural gas, and coal. The base year 2003 was chosen for the analysis, the last year for which relevant data is available.

Data for the base year were collected for the energy expenditures made by Arizona end-use consumers and energy suppliers. Assumptions are made as to which costs are reinvested in-state and which costs are not. For example: wages and state and local taxes are considered reinvestments in Arizona.

Once state and local costs are allocated and totaled, the balance of the business expenditures can be expressed as a percentage of energy dollars that are not reinvested, leaving the pocketbooks of Arizonans without a subsequent economic benefit to the state. The individual industry-sector dollar outflows are then aggregated to determine an overall percentage dollar outflow.

ASSUMPTIONS

Several assumptions were made about the costs incurred by Arizona energy industries. Because only a small amount of the raw energy resources used for fuel by energy suppliers is produced or refined in Arizona, direct fuel costs represent a major dollar outflow from the state economy. Additionally, it is assumed that most capital expenditures by electric utilities are not reinvested in Arizona because utility repayment of debt financing of capital equipment purchases flows out-of-state. Furthermore, it is assumed that such capital expenditures of the electric utilities and coal industry leave the economy because heavy equipment manufacturers serving these industries are not headquartered in Arizona. Relevant in-state capital expenditure data were available for the natural gas industry in 2003, and so are included as a specific line item in this analysis.

Other Assumptions Worth Noting Are:

- Wage and salaries remain in Arizona
- Operating and maintenance expenditures remain in Arizona
- Federal taxes leave Arizona

ELECTRIC INDUSTRY

The electric industry's share of Arizona end-use energy expenditures surveyed was 47.0 percent during 2003. An estimated 56.5 percent of expenditures for electricity by Arizona end-users are not reinvested in the state economy. The three largest utility companies were chosen to represent the industry in order to estimate the percentage of electric expenditures not reinvested: Arizona Public Service, the Salt River Project, and Tucson Electric Power. In 2003, these three utility companies accounted for 97.6 percent of total electric expenditures by Arizona end-use consumers.

The calculations for the estimate were fairly straightforward. The main sources of information utilized in the calculations were the Federal Energy Regulatory Commission (FERC) Form No. 1, corporate annual reports, and discussions with the three utility legal and accounting departments. Revenue from sales of electricity within Arizona came from discussions with the utility accounting departments. Wage and salary information, as well as maintenance expenses came from FERC Form No. 1. Fuels purchased in Arizona, and state and local tax information came from the FERC Form No. 1. Dividend and bond interest figures were taken from company annual reports. The 2003 Arizona population, from the U.S. Census Bureau estimates for 2003, represents 1.9 percent of the total United States population. Applying that percent to total dividends and total bond interest paid, an estimate for the amount of dividends and bond interest paid to Arizona residents was derived. The total Estimated Revenue for Electricity in Arizona comes from U.S. Department of Energy, Energy Information Administration figures.

Arizona Public Service

Electric Revenues (sales within AZ)	\$1,933,360,854
Wage and Salaries	- \$460,485,692
Maintenance Expense	-\$333,788,996
Fuels Purchased in Arizona	-\$24,355,600
State and Local Taxes	-\$274,374,640
Dividends paid to Arizona residents	-\$9,213,279
Bond interest paid to Arizona residents	-\$2,711,414
\$\$ Not Reinvested In-State	\$828,431,233
	=====

Salt River Project

Electric Revenues (sales within AZ)	\$1,967,575,968
Wages and Salaries	-\$277,818,114
Maintenance Expense	-\$141,639,704
Fuels Purchased in Arizona	-\$85,901,378
State and Local Taxes	-\$88,366,237
Dividends paid to Arizona residents	-\$0
Bond interest paid to Arizona residents	-\$2,507,601
\$\$ Not Reinvested In-State	\$1,371,342,934
	=====

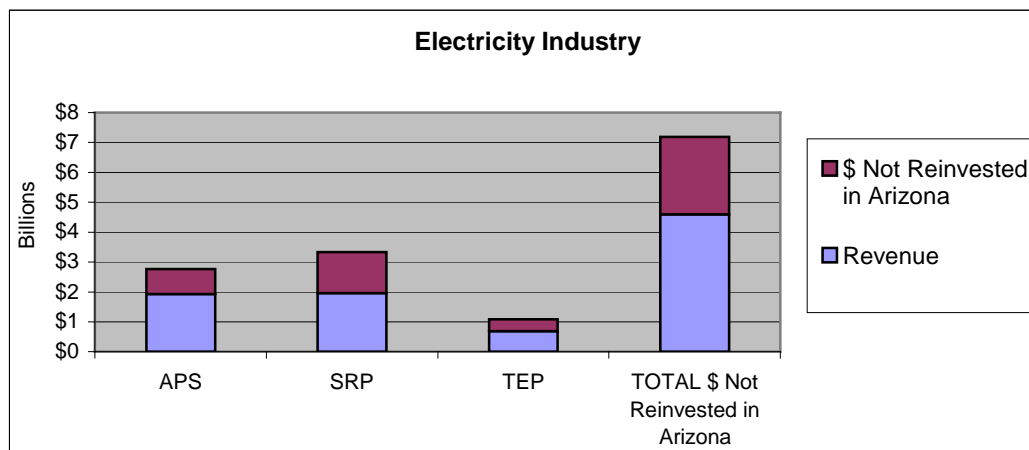
Tucson Electric Power

Electric Revenues (sales within AZ)	\$691,503,000
Wages and Salaries	-\$64,110,457
Maintenance Expense	-\$26,859,246
Fuels Purchased in Arizona	-\$165,365,000
State and Local Taxes	-\$39,049,663
Dividends paid to Arizona residents	-\$146,092
Bond interest paid to Arizona residents	--
\$\$ Not Reinvested In-State	\$395,972,542
	=====

Electric Utility Calculations:

Utility	Electricity Revenues*	\$\$ Not Reinvested
Arizona Public Service	\$1,933,360,854	\$828,431,233
Salt River Project	\$1,967,575,968	\$1,371,342,934
Tucson Electric Power	\$691,503,000	\$395,972,542
Total	\$4,592,439,822	\$2,595,746,709

* Revenues are for *in-state sales of electricity* only; does not include revenue from sales of electricity out-of-state.



Assumptions:

- 1) These three companies represent 97.6% of the total electricity sector in Arizona.
- 2) Percent not reinvested in Arizona by these three companies equals 56.5%.
- 3) The 56.5% ratios were also applied to the remaining electric companies in Arizona which represent 2.4% of the total electricity market.

$$\begin{array}{rcl} & \$4,592,439,822 & \\ \text{Total Estimated Revenue for Electricity in Arizona: } & \text{-----} & = 4,705,368,670 \\ & .976 & \text{=====} \end{array}$$

$$\begin{array}{rcl} \text{\$ \$ Not Reinvested in Arizona: } & \$4,705,368,670 * .565 = & \text{\$2,658,533,299} \\ & & \text{=====} \end{array}$$

PETROLEUM INDUSTRY

Arizona's gasoline providers are striving to build the resources necessary to meet the State's growing petroleum needs. And the successful completion of this project will help to ensure Arizona a future of reliable petroleum flows. Petroleum products are used throughout the economy, but their main use is for transportation. Since Arizona has no refineries the state must import all of its petroleum products.

In 2003, 43.3 percent of surveyed energy expenditures in Arizona were for motor gasoline. Based on the information surveyed, an estimated 79.4 cents on each dollar spent on motor gasoline is not reinvested in Arizona.

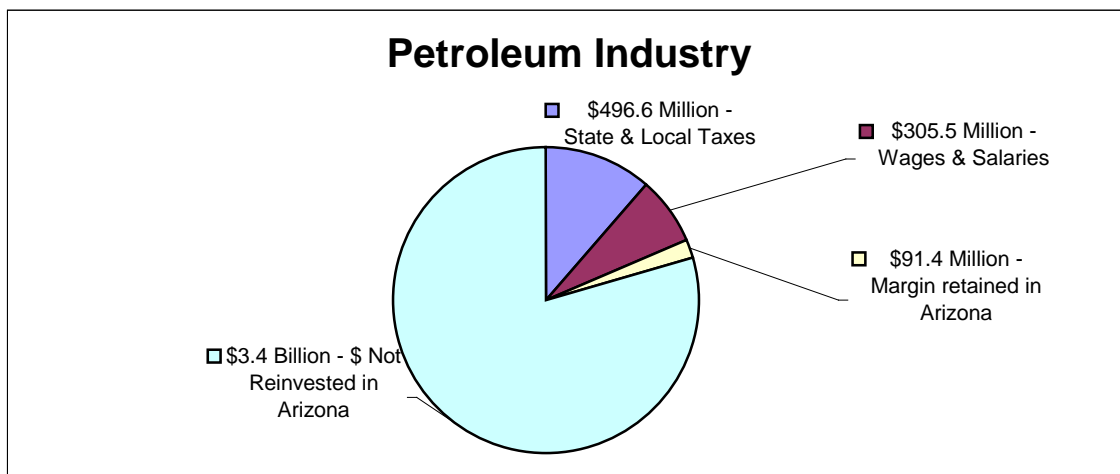
The number of gallons of gasoline consumed in Arizona was supplied by the Arizona Department of Transportation. The Highway Users Federation provided state gasoline tax data (18 cents per gallon). Plus there is a one-cent Arizona state underground storage-tank (UST) tax. Wage and salary data came from the Arizona Department of Economic Security (D.E.S.) using the North American Industry Classification System [NAICS] 447110 and 447190.

A weighted average cost per gallon of motor gasoline (\$1.6603) was estimated from data available from the Lundberg Survey. The Southwest Automotive Trade Alliance identified the average total margin per gallon of gasoline (\$.07), representing profits, maintenance, and capital expenses incurred in the marketing of gasoline. A total value of the margin was estimated by multiplying the average margin per gallon by the total number of gallons consumed.

Assumption: 50% of net margin is reinvested in-state; 50% is not.

Petroleum Industry - Motor Gasoline Calculations:

Gallons Consumed	<u>2,613,900,750</u>
Petroleum Revenues (sales within AZ)	\$4,339,859,415
State and Local Taxes	-\$496,641,143
Wages and Salaries	-\$305,500,578
Margin retained in Arizona	<u>-\$91,486,526</u>
\$\$ Not Reinvested In-State	\$3,446,231,168 =====



NATURAL GAS INDUSTRY

The natural gas industry accounted for 7.9 percent of Arizona's surveyed end-use energy expenditures in 2003. An estimated 58.2 percent of expenditures for natural gas by Arizona end-users is not reinvested in the Arizona economy.

Only Citizens Utilities, UniSource Energy Services, and Southwest Gas have been analyzed in this report, as they are currently the largest natural gas suppliers in Arizona, constituting 96.2 percent of the total dollars spent by Arizona consumers on natural gas services in 2003.

August 11, 2003 Citizens Utilities were sold to Unisource Energy Services.

The main source of information utilized in the calculations came from annual reports filed with the Arizona Corporation Commission as well as discussions with the accounting departments of the natural gas companies. Arizona revenues, wages, and operating and maintenance expenses came from their annual reports. Capital expenditures, state and local taxes, and dividends paid to Arizona residents came from discussions with the natural gas companies' accounting departments.

Assumption: All natural gas is purchased from outside of Arizona.

Citizens Utilities only Jan. 1, 2003 – Aug. 10, 2003 Estimated

Gas Revenues (sales within AZ)	\$76,148,000
Wages and Salaries	-\$4,967,000
Operating and Maintenance Expense	-\$8,528,000
Capital Expenditures	-\$13,838,000
State and Local Taxes	-\$3,400,000
Dividends paid to Arizona residents	-\$0
Bond interest paid to Arizona residents	-\$0
\$\$ Not Reinvested In-State	\$45,415,000
	=====

Unisource Energy Services Aug. 11, 2003 – Dec. 31, 2003

Gas Revenues (sales within AZ)	\$47,297,000
Wages and Salaries	-\$3,085,000
Operating and Maintenance Expense	-\$5,297,000
Capital Expenditures	-\$8,595,000
State and Local Taxes	-\$2,112,000
Dividends paid to Arizona residents	-\$0
Bond interest paid to Arizona residents	-\$0
\$\$ Not Reinvested In-State	\$28,208,000
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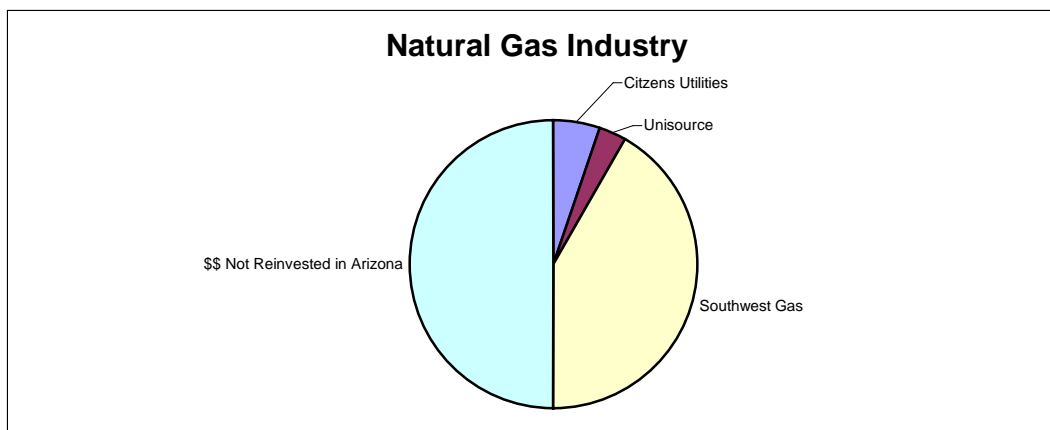
Southwest Gas

Gas Revenues (sales within AZ)	\$635,487,848
Wages and Salaries	-\$73,482,110
Operating and Maintenance Expense	-\$29,971,159
Capital Expenditures	-\$87,103,610
State and Local Taxes	-\$69,859,045
Dividends paid to Arizona residents	-\$7,245,165
Bond interest paid to Arizona residents	-\$0
\$\$ Not Reinvested In-State	\$367,826,759
	=====

Natural Gas Utility Calculations:

Utility	Natural Gas Revenue*	\$\$ Not Reinvested
Citizens Utilities	\$76,148,000	\$45,415,000
Unisource Energy Services	\$47,297,000	\$28,208,000
Southwest Gas	\$635,487,848	\$367,826,759
Total	\$758,932,848	\$441,449,759

* Revenues are for *in-state sales of natural gas only*.



Assumptions:

- 1) These three companies represent 96.2% of the total natural gas sector in Arizona.
- 2) Percent not reinvested in Arizona by these three companies equals 58.2.
- 3) The 58.2% ratios were also applied to the remaining natural gas companies in Arizona, which represents 3.8% of the total natural gas market.

$$\text{Total Estimated Revenue for Natural Gas in Arizona: } \frac{\$758,932,848}{.962} = \$788,911,484$$

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$$\text{\$ \$ Not Reinvested in Arizona: } \$788,911,484 * .582 = \$459,146,484$$

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Note: We ignored direct sales to end users, such as mines and power plants. So, estimates are somewhat understated. This is not significant for 2003. But, as Arizona's portfolio of merchant, gas-fired power plants grows, we will have to include direct natural gas purchases by these entities.

COAL INDUSTRY

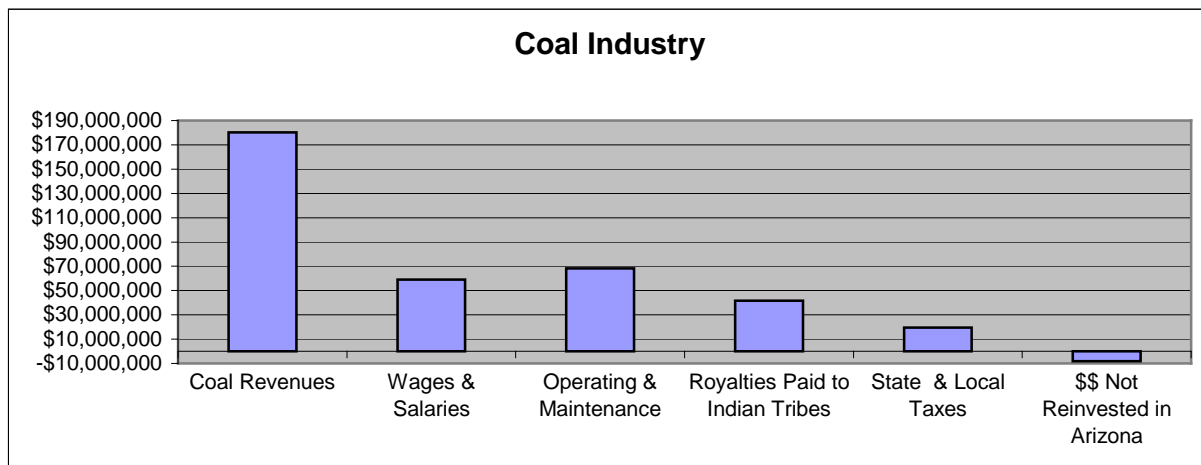
The coal industry accounted for 1.8 percent of surveyed end-use energy expenditures in Arizona for calendar year 2003.

An estimated 4.5 percent of expenditures for coal are not reinvested in Arizona.

Coal Revenues (sales within AZ)	\$180,185,439
Wages and Salaries	-\$58,989,054
Operating and Maintenance Expense	-\$68,167,791
Royalties Paid to Indian Tribes	-\$41,669,303
State and Local Taxes	<u>-\$19,454,896</u>
\$\$ Not Reinvested In-State	- \$8,095,605
	=====

Percent Not Reinvested In Arizona: **-\$8,095,605****
----- = **- 4.5%**
\$180,185,439 **=====**

** The negative number of **\$8.1** million represents expenditures in Arizona from the coal industry's out-of-state business to fund Arizona's in-state operations.



Estimates of Expenditures Leaving Arizona for Fuel Types Surveyed, 2003

Fuel	Total Revenues	\$\$ Not Reinvested	% Not Reinvested
Electricity	\$4,705,368,670	\$2,658,533,299	56.5%
Petroleum	\$4,339,859,415	\$3,446,231,168	79.4%
Natural Gas	\$788,911,484	\$459,146,484	58.2%
Coal*	\$180,185,439	-\$8,095,605	-4.5%
Coal Adjustment Factor**		-\$275,621,978	
Total	\$10,014,325,008	\$6,280,193,368	62.7%

* The negative number of \$8.1 million implies that this amount was spent by the coal industry in Arizona during 2003; but the money was not generated from coal operations in Arizona in 2003.

** Coal Adjustment Factor: A future level of analysis is necessary for an aggregated expenditure estimate because electric utilities consume coal as a feedstock fuel for electricity generation. To eliminate double counting of coal revenues and purchases between the coal and electric utility analysis, a dollar adjustment factor equivalent to electric utility purchases of in-state coal is applied as a correction.

Net Energy Expenditures Not Reinvested In-State:	\$6.3 billion
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Percentage of Energy Expenditures Not Reinvested In-State: 62.7%

CONCLUSION

This report quantifies that portion of Arizona's 2003 energy expenditures that flowed out-of-state without subsequent economic benefit. The outflow of \$6.3 billion equates to approximately 3.5 percent, Arizona's gross state product in 2003, underscores Arizona's dependence on other states, and can be viewed as an enormous lost opportunity.

Arizona is not endowed with vast reserves of the fuels examined in this analysis; as a consequence, the state will probably always experience a net outflow of dollars spent for energy services. Reducing this outflow by the cost-effective application of energy conservation and energy efficiency technologies can make funds available for other productive investment in the local economy.

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Arizona Department of Commerce Energy Office

Education and Community Outreach Programs

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